

Ecological site F227XY108AK

Gravelly and Sandy Terraces Pippod, Clarena, Chistna

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General information

**Provisional.** A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.



Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Table 1. Dominant plant species

|            |   |
|------------|---|
| Tree       | (1) <i>Picea mariana</i><br>(2) <i>Picea glauca</i> |
| Shrub      | (1) <i>Betula glandulosa</i>                        |
| Herbaceous | Not specified                                       |

Physiographic features

This site consists of isolated strandline deposits on glaciolacustrine uplands and alluvial fans. The landscape is formed in deep, sandy and gravelly materials, often overlain by a thin mantle of eolian silts. Slopes generally range from 0 to about 12 percent. Occasional short slopes up to 25 percent occur also. Elevation is from 1900 to 2700 feet (579 to 823 m).

In the Gulkana River area, this site occurs as scattered, relatively small areas of strandline deposits throughout most of the uplands with the exception of the South Branch. It is found on high terraces immediately above the River corridor and on nearby lacustrine terraces. The site also occurs on fan terraces along the Middle Fork. This site probably occurs on strandline deposits, eskers, and alluvial fans throughout the central Copper River basin.

Table 2. Representative physiographic features

|                    |  |
|--------------------|--|
| Landforms          | (1) Terminal moraine<br>(2) Alluvial fan |
| Flooding frequency | None                                     |
| Elevation          | 579–823 m                                |
| Slope              | 0–12%                                    |
| Aspect             | Aspect is not a significant factor       |

## Climatic features

The subarctic continental climate of this site is characterized by long cold winters and short warm summers. Mean January temperature is -2 °F.; mean July temperature is 54 °F. Mean annual precipitation ranges from 15 to 19 inches. Annual snowfall ranges from 54 to 102 inches. The frost-free season is about 60 to 80 days (28 °F. base temperature). The growing season varies greatly from year to year and frosts can occur during any summer month.

**Table 3. Representative climatic features**

|                               |         |
|-------------------------------|---------|
| Frost-free period (average)   | 80 days |
| Freeze-free period (average)  | 0 days  |
| Precipitation total (average) | 483 mm  |

## Influencing water features

### Soil features

The moderately well developed soils on this site have a thin mantle of silty eolian material 1 to 8 inches (2.5 to 20 cm) thick over very gravelly or sandy glaciofluvial materials. Most have a thin organic mat up to about 3 inches (8 cm) thick. Permeability is rapid and the soils are somewhat excessively drained. Depth to seasonal high water table is greater than 6 feet (1.8 m). Because of the coarse textures and low water holding capacity, these soils are relatively dry throughout the growing season. Chistna, Pippod, Cryochrepts, and Cryorthents (The thickness of the surface organic mat is usually 2 inches [5 cm] or less. Coarse soil texture, steep slopes, and/or convex slope shape result in dry growing conditions.)

Depth to permafrost: greater than 60 inches (greater than 152 cm)

Depth to seasonally high water table: greater than 60 inches (greater than 152 cm)

**Table 4. Representative soil features**

|   |               |
|---|---------------|
| Surface texture                         | (1) Silt loam |
| Family particle size                    | (1) Sandy     |
| Soil depth                              | 152 cm        |
| Available water capacity<br>(0-101.6cm) | 0.36–0.51 cm  |

## Ecological dynamics

Spruce/lichen woodland is the correlated Potential Natural Plant Community on this site. This PNC probably is best described as a fire climax (depends on being burned at rather regular intervals). Microsites that have remained unburned for an extended period and cooler and moister microsites, such as northerly aspects and concave slopes, often support Spruce/shrub birch woodland.

This site appears to be near the dry extreme of wooded sites in the Copper River basin and, therefore, is probably more susceptible to wild fire than most other woodland sites. The moderately open to closed cover of *Betula glandulosa* in the understory would readily carry a fire throughout the stand. The prevalence of *Picea mariana* as the major tree species in many stands may be a result of repeated fires, which tend to favor *Picea mariana*.

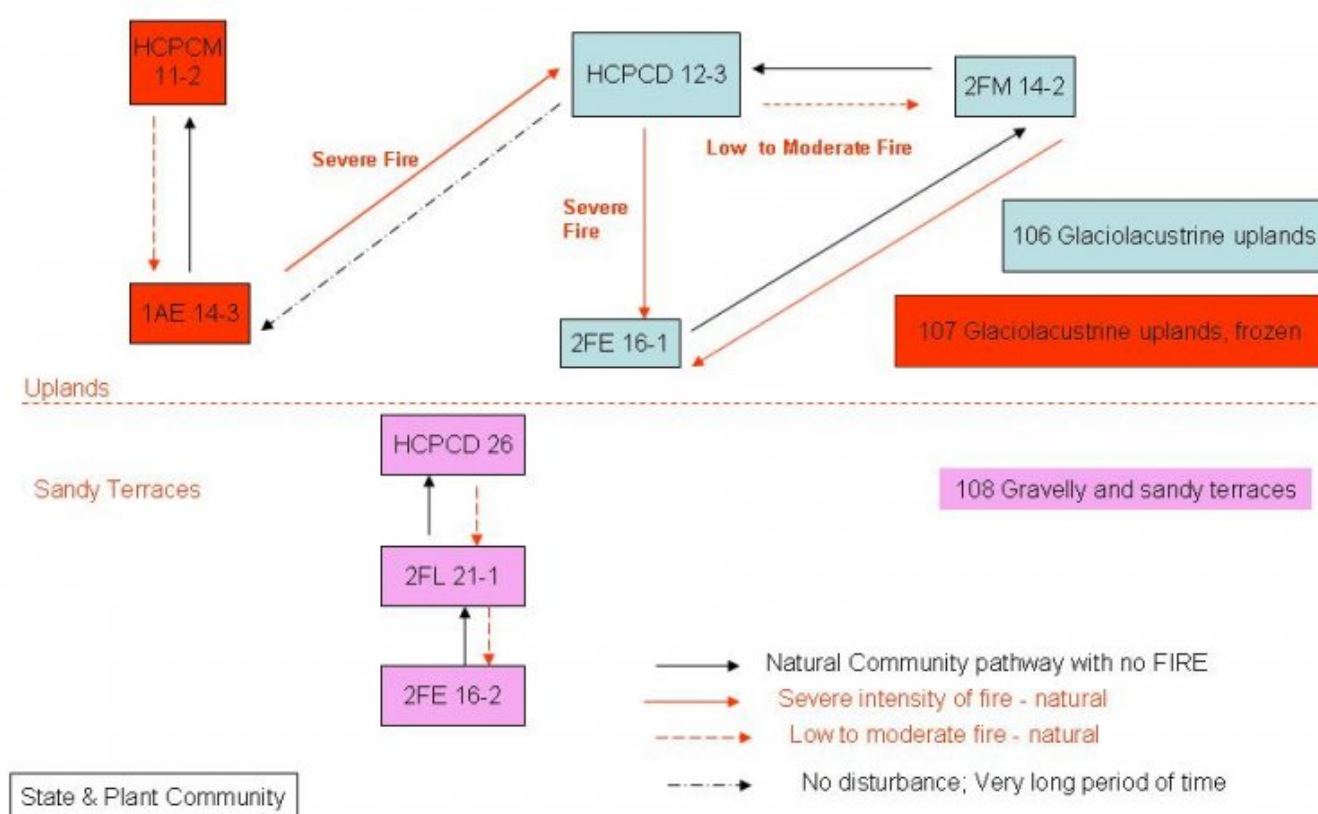
regeneration at the expense of *Picea glauca*. Because of the dry soil conditions, this site also appears to be less likely to develop the thick moss-organic layer on the soil surface than more moist sites.

In most instances, fire would kill the spruce trees and destroy much if not all of the woodland overstory. Early seral vegetation likely would be scrub dominated by *Betula glandulosa*, ericaceous shrubs, and tall *Salix* spp., primarily *Salix glauca* and *Salix bebbiana*. Tree regeneration likely would begin almost immediately following the burn. The semi-serotinous cones of *Picea mariana* would provide an immediate seed source in areas with *Picea mariana* in the original stand. *Populus tremuloides*, with light, wind disseminated seed, would also find a suitable seed bed. In many places, this site currently support Quaking aspen-white spruce forest. Regeneration of *Picea glauca*, which produces adequate seed crops infrequently, would be largely dependent on the timing of seed production and the availability of a suitable seed bed.

The ground layer initially would be dominated by sparse herbs and mosses adapted to bare mineral soils, such as *Polytrichum* spp. and *Ceratodon purpureus*. Lichens and patches of moss would begin to displace much of the herbaceous vegetation within a few years.

## State and transition model

Relationship between permafrost and non-permafrost ecological sites on uplands and terraces



## State 1 Spruce Lichen Woodland

### Community 1.1 Spruce Lichen Woodland

Spruce/lichen woodland consists of woodland to moderately open stands of *Picea glauca* and *P. mariana*. Where both species occur, the tallest trees are typically *P. glauca*, while *P. mariana* is mixed with the *P. glauca* in lower

tree layers. In some stands, *P. mariana* is dominant in all tree layers. Spruce/lichen woodland is best described as mid to late seral. This type develops from Low shrub birch/lichen scrub on coarse textured soils following severe wildfires. Spruce/lichen woodland is probably potential vegetation on sites with a short fire return interval. Elsewhere, and on finer textured soils, continued succession may lead to Spruce/shrub birch woodland or Spruce/spruce muskeg sedge open forest. Spruce/lichen woodland is similar in structure and composition to Spruce/shrub birch woodland. Lichen cover is lower and moss cover higher in Spruce/shrub birch woodland. Riparian-Wetland Status Classification: upland

**Forest overstory.** Tree canopy cover ranges from 15 to 60 percent. In most stands, tree size varies from regeneration to medium height. The tallest trees in a stand are generally 15 to 45 feet (4.5 to 13.8 m) in height and 4 to 6.5 inches (10 to 16.5 cm) in diameter at ground level. Tree basal area in 5 sample stands ranged from 44 to 85 feet<sup>2</sup>/acre (10.1 to 19.5 m<sup>2</sup>/ha).

**Forest understory.** Although medium, low, and dwarf shrubs form a nearly continuous, open to closed shrub layer, the overall aspect of the understory is dominated by a patchy to nearly continuous cover of mixed fruticose lichens and mosses on the ground surface. Common lichen generally include Cladina, Cladonia, and Stereocaulon. Common mosses include Tomentypnum, Ptilium, and Polytrichum. Lichen cover ranges from 30 to 65 percent and moss cover from 5 to 40 percent.

Shrub cover ranges from 35 to 65 percent and from 1 to 8 feet (0.3 to 2.4 m) in height. Important medium and low shrubs are *Betula glandulosa*, *Ledum* spp., *Vaccinium uliginosum*, *V. vitis-idaea*, *Salix planifolia*, and *Empetrum nigrum*. Herbs are sparse to common in most stands of Spruce/lichen woodland.

**Table 5. Ground cover**

|                                   |       |
|-----------------------------------|-------|
| Tree foliar cover                 | 1-40% |
| Shrub/vine/liana foliar cover     | 1-75% |
| Grass/grasslike foliar cover      | 1-15% |
| Forb foliar cover                 | 1-15% |
| Non-vascular plants               | 5-65% |
| Biological crusts                 | 0%    |
| Litter                            | 1-35% |
| Surface fragments >0.25" and <=3" | 0%    |
| Surface fragments >3"             | 0%    |
| Bedrock                           | 0%    |
| Water                             | 0%    |
| Bare ground                       | 1-35% |

**Table 6. Canopy structure (% cover)**

| Height Above Ground (M) | Tree   | Shrub/Vine | Grass/<br>Grasslike | Forb  |
|-------------------------|--------|------------|---------------------|-------|
| <0.15                   | —      | —          | —                   | —     |
| >0.15 <= 0.3            | —      | —          | 1-15%               | 1-15% |
| >0.3 <= 0.6             | —      | —          | —                   | —     |
| >0.6 <= 1.4             | —      | 35-70%     | —                   | —     |
| >1.4 <= 4               | —      | —          | —                   | —     |
| >4 <= 12                | 20-50% | —          | —                   | —     |
| >12 <= 24               | —      | —          | —                   | —     |
| >24 <= 37               | —      | —          | —                   | —     |
| >37                     | —      | —          | —                   | —     |

Figure 3. Plant community growth curve (percent production by month).  
AK0001, MLRA 172 Balsam poplar-whitespruce/thinleaf alder. Mixed forest shrub on floodplains..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0   | 0   | 0   | 0   | 15  | 30  | 45  | 10  | 0   | 0   | 0   | 0   |

## State 2

### Quaking Aspen-White Spruce Forest

#### Community 2.1

##### Quaking Aspen-White Spruce Forest

Quaking aspen forest consists of moderately open to closed stands of *Populus tremuloides* and common *Picea glauca* and/or *P. mariana*. Where present, quaking aspen appears to be a mid to late seral stage. On escarpments and other very steep slopes, this type is usually on upper, convex positions and may be the potential for these sites. Elsewhere, continued succession may lead to either a *Picea glauca* or *P. mariana* dominated stand or mixed stands of *Picea* spp. and *Populus tremuloides*. Recurring wildfires probably destroy the stands before succession can advance to a later spruce stage. Wetland Status Classification: upland

**Forest overstory.** Tree canopy cover ranges from 50 to 80 percent. *Populus tremuloides* trees are often relatively short and poorly formed with open, sparsely limbed crowns. On steep escarpments, the lower bole is frequently crooked or bowed from soil creep.

**Forest understory.** The understory varies considerably but in most stands is dominated by scattered shrubs and sparse herbs. Frequently occurring shrubs include *Shepherdia canadensis*, *Rosa acicularis*, *Vaccinium uliginosum*, *V. vitis-idaea*, and *Arctostaphylos uva-ursi*. Many stands have common tall and medium *Salix* spp. Herbs are generally sparse; frequently occurring species include *Epilobium angustifolium*, *Geocaulon lividum*, *Linnaea borealis*, and *Festuca altaica*. Woody debris and other litter and small, scattered patches of moss and lichen cover the ground surface.

Figure 4. Plant community growth curve (percent production by month).  
AK0001, MLRA 172 Balsam poplar-whitespruce/thinleaf alder. Mixed forest shrub on floodplains..

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0   | 0   | 0   | 0   | 15  | 30  | 45  | 10  | 0   | 0   | 0   | 0   |

## State 3

### Low Shrub Birch Lichen Scrub

#### Community 3.1

##### Low Shrub Birch Lichen Scrub

Low shrub birch/lichen scrub consists of moderately open to closed stands of medium and low shrubs dominated by *Betula glandulosa*, *Ledum* spp., *Vaccinium uliginosum*, and *Salix* spp., with abundant to very abundant fruticose lichens in the ground layer. Dwarf shrub, primarily *Vaccinium vitis-idaea* and *Empetrum nigrum*, are also usually well-represented to abundant. In most places, Low shrub birch scrub is an early, post-fire seral stage leading to Spruce/lichen woodland and Spruce/shrub birch woodland. It appears to develop only on relatively xeric sites or other sites that have been moderately to severely burned. Most stands have common to well-represented scattered trees and unburned woodland to reseed the stand. *Picea glauca* and *P. mariana* seedlings and saplings are common in most stands. On pitted outwash plains and hills in the vicinity of Dickey Lake and at higher elevations in the subalpine zone, this type probably is late seral or potential vegetation. Riparian-Wetland Status Classification: upland

**Forest understory.** *B. glandulosa* is typically 3.5 to 5.5 feet (1.1 to 1.8 m) in height and forms a nearly continuous open to moderately closed upper shrub layer. Other shrubs are usually about 3 feet (0.9 m) in height or less and fill in the spaces between and below the birch. In many stands, *Picea glauca* and/or *P. mariana* saplings, small trees,

and relic trees are common to well-represented. Total shrub canopy cover is usually between 50 and 90 percent.

Abundant to very abundant lichen cover, patches of mosses, and litter characterize the aspect of the ground layer. In most stands, the herb layer is sparse to occasionally open and the number of herb species is low. An important herb in many stands is *Festuca altaica*. Other frequently occurring herbs include *Epilobium angustifolium*, *Pedicularis labradorica*, *Senecio* spp., *Petasites frigidus*, *Arctagrostis latifolia*, and *Calamagrostis canadensis*. Most stands show evidence of recent burns, and snags and woody litter are common to well-represented.

**Table 7. Ground cover**

|                                   |       |
|-----------------------------------|-------|
| Tree foliar cover                 | 1-7%  |
| Shrub/vine/liana foliar cover     | 1-85% |
| Grass/grasslike foliar cover      | 1-20% |
| Forb foliar cover                 | 1-10% |
| Non-vascular plants               | 5-70% |
| Biological crusts                 | 0%    |
| Litter                            | 1-30% |
| Surface fragments >0.25" and <=3" | 0%    |
| Surface fragments >3"             | 0%    |
| Bedrock                           | 0%    |
| Water                             | 0%    |
| Bare ground                       | 1-10% |

## **Additional community tables**

### **Contributors**

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## **Rangeland health reference sheet**

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

|   |                   |
|---|-------------------|
| Author(s)/participant(s)                    |                   |
| Contact for lead author                     |                   |
| Date  |                   |
| Approved by                                 |                   |
| Approval date                               |                   |
| Composition (Indicators 10 and 12) based on | Annual Production |

## **Indicators**

### **1. Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant:

Sub-dominant:

Other:

Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth ( in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

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17. **Perennial plant reproductive capability:**

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